इंटरनेट मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 5479 (1985): Solders for jointing aluminium and aluminium alloys [MTD 9: Lead, Zinc, Cadmium, Tin, Antimony and their Alloys]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"

Act Number 22 of 2005
The Indian Parliament
RIGHT TO INFORMATION

Made Available By
Public.Resource.Org

"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

BRUTUM FULMEN

IGNORANTIA JURIS NON EXCUSAT

PROTECTED BY COPYRIGHT

IS : 5479 - 1985

(Reaffirmed 2006)

Indian Standard

SPECIFICATION FOR SOLDERS FOR JOINTING ALUMINIUM AND ALUMINIUM ALLOYS

(First Revision)

UDC 621·791·35·04 : 669·71

© *Copyright* 1986

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2

June 1986

Indian Standard

SPECIFICATION FOR SOLDERS FOR JOINTING ALUMINIUM AND ALUMINIUM ALLOYS

(First Revision)

Lead, Zinc, Tin, Antimony and Their Alloys Sectional Committee, SMDC 12

Chairman	*Representing*
Shri F. A. A. Jasdanwalla	Adamji Lookmanji and Co, Bombay
Members	
Shri V. K. Bhandari	Union Carbide India Ltd, Calcutta
Shri N. Sreenivasan (*Alternate*)	
Shri Balkrishna Binani	Rashtriya Metal Industries Ltd, Bombay
Shri K. Mahendra Singh (*Alternate*)	
Shri C. R. Chakrabarty	Ministry of Defence (R & D)
Shri S. S. Guha	Ministry of Defence (DGI)
Shri A. B. Bhattacharya (*Alternate*)	
Deputy Director (Met-I), RDSO	Ministry of Railways
Chemist & Metallurgist, NR, Lucknow (*Alternate*)	
Shri H. P. Dubey	National Test House, Calcutta
Dr R. Dutta	Chemmetals, Calcutta
Shri H. De (*Alternate*)	
Shri D. P. Jain	Saru Smelting (P) Ltd, Meerut
Shri S. C. Chandha (*Alternate*)	
Shri Kishorilal	National Metallurgical Laboratory (CSIR), Jamshedpur
Shri C. S. Sivaramkrishnan (*Alternate*)	
Shri N. N. Maniar	The Indian Standard Metal Co Ltd, Bombay
Shri R. K. Sawant (*Alternate*)	
Shri Laxman Mishra	Directorate General of Technical Development, New Delhi
Shri M. K. Banerjee (*Alternate*)	
Shri G. D. Modi	All India Type Founders Federation, Bombay
Shri Pritosh Dhar (*Alternate* I)	
Shri A. M. Thirunavukarasu (*Alternate* II)	
Shri B. R. Rai	Cominco Binani Zinc Ltd, Bnanipuram
Shri N. Srinivasan (*Alternate*)	
Dr P. K. Ganguly	Institute of Indian Foundrymen, Bombay
Shri R. N. Saha	Directorate General of Supplies & Disposals (Inspection Wing), New Delhi
Shri N. R. Rasane (*Alternate*)	
Shri R. L. N. Sastry	Indian Smelting & Refining Co Ltd, Bombay
Shri T. R. Shanmugam	Bharat Electronics Ltd, Bangalore

(*Continued on page* 2)

© *Copyright* 1986
INDIAN STANDARDS INSTITUTION
The publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be demeed to be an infringement of copyright under the said Act.

(*Continued from page* 1)

Members	*Representing*
SHRI T. SINGH	The Indian Cable Co Ltd, Jamshedpur
SHRI T. CHOWDHRY (*Alternate*)	
DR G. SIVARAMAIAH	Indian Lead/Zinc Information Centre, New Delhi
SHRI V. R. SUBRAMANIAN	Indian Hot Dip Galvanizers Association, New Delhi
SHRI L. PUGAZENTHY (*Alternate*)	
SHRI B. C. THADHANI	Indian Lead Pvt Ltd, Thane
SHRI I. LAKHANI (*Alternate*)	
SHRI A. C. WADHAVAN	Hindustan Zinc Ltd, Udaipur
SHRI S. V. VENKATESH (*Alternate*)	
SHRI K. RAGHAVENDRAN, Director (Struc & Met)	Director General, ISI (*Ex-officio Member*)

Secretaries

SHRI A. B. TEWARI
Deputy Director (Metals), ISI
SHRI JAGMOHAN SINGH
Deputy Director (Metals), ISI

Indian Standard

SPECIFICATION FOR SOLDERS FOR JOINTING ALUMINIUM AND ALUMINIUM ALLOYS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 25 November 1985, after the draft finalized by the Lead, Zinc, Tin, Antimony and Their Alloys Sectional Committee had been approved by the Structural and Metal Division Council.

0.2 This standard was first published in 1969. It was felt that Sn Zn10 and SnZn15 solders were not in regular use and have been deleted in this revision. A new ternary Abrasion solder which is used for jointing Aluminium sheath, solidal cables and on lugs and connectors for Aluminium Wound transformers has been added.

0.3 Both soft and hard solders are used for jointing aluminium and aluminium alloys. Soft solders are alloys which have melting point below 300°C and hard solders have melting point above 300°C but generally below 500°C.

0.3.1 Information on types of fluxes used, melting ranges and the typical applications of the solders is included in Appendix A.

0.4 This standard contains **6.1.1** which call for agreement between the purchaser and the manufacturer.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers requirements for five grades of soft solders and four grades of hard solders for jointing aluminium and aluminium alloys.

2. SUPPLY OF MATERIAL

2.1 General requirements relating to the supply of solders for jointing aluminium and aluminium alloys shall conform to IS : 1387-1967*.

3. MANUFACTURE

3.1 Solders shall be made from virgin metals or such clean scrap as may result from the manufacture of material of the same composition.

4. CHEMICAL COMPOSITION

4.1 Soft solders when analysed either in accordance with IS : 8097-1976† or any other established chemical/instrumental method shall have the chemical composition as given in Table 1. In case of dispute the procedure given in IS : 8097-1976† shall be the refree method.

4.2 Hard solders when analysed either in accordance with IS : 8812 (Part 1)-1978‡ and IS : 8812 (Part 2)-1982§ or any other established chemical/instrumental method shall have the chemical composition as given in Table 2. In case of dispute the procedure given in IS : 8812 (Part 1)-1978‡ and IS : 8812 (Part 2)-1982§ shall be refree method.

5. FREEDOM FROM DEFECTS

5.1 The material shall be of uniform quality, clean and free from foreign matter.

6. CONDITIONS OF SUPPLY

6.1 Unless otherwise agreed to, solders shall be supplied in the form of sticks each approximately 300 mm long and weighing about 600 g.

---

*General requirements for the supply of metallurgical material.

†Methods of chemical analysis of soft solders for jointing aluminium and its alloys.

‡Methods for chemical analysis of hard solders for jointing aluminium and its alloys : Part 1 Determination of silver, copper, zinc, antimony, arsenic, iron and bismuth.

§Methods for chemical analysis of hard solders for jointing aluminium and its alloys : Part 2 Determination of aluminium.

TABLE 1 CHEMICAL COMPOSITION OF SOFT SOLDERS

(*Clause* 4.1)

GRADE	ALLOYING ELEMENTS PERCENT			TIN	IMPURITIES PERCENT, *Max*						TOTAL IMPURITIES, PERCENT *Max*
	Zinc	Lead	Cadmium		Antimony	Arsenic	Iron	Bismuth	Copper	Aluminium	
SnZn20	19·25-20·75	—	—	Remainder	0·04	0·05	0·02	0·04	0·05	0·001	0·25
SnZn30	29-31	—	—	Remainder	0·04	0·05	0·02	0·04	0·05	0·001	0·25
SnPb53Zn	1·75-2·25	52-54	—	Remainder	0·04	0·05	0·02	0·04	0·05	0·001	0·25
SnPb58Zn	1·75-2·25	57-59	—	Remainder	0·04	0·05	0·02	0·04	0·05	0·001	0·25
SnZn35Cd10	34-36	—	9·5-10·5	Remainder	0·04	0·05	0·02	0·04	0·05	0·001	0·25

TABLE 2 CHEMICAL COMPOSITION OF HARD SOLDERS

(*Clause* 4.2)

GRADE	ALLOYING ELEMENTS, PERCENT			ZINC	IMPURITIES, PERCENT, *Max*					TOTAL IMPURITIES PERCENT, *Max*
	Aluminium	Silver	Copper		Antimony	Arsenic	Iron	Bismuth	Copper	
ZnAg5	—	4·75-5·25	—	Remainder	0·04	0·05	0·02	0·04	0·04	0·25
ZnAl-5	4·75-5·25	—	—	Remainder	0·04	0·05	0·02	0·04	0·04	0·25
ZnAl-5Cu5	4·75-5·25	—	4·75-5·25	Remainder	0·04	0·05	0·02	0·04	—	0·25
ZnAl-30	29-31	—	—	Remainder	0·04	0·05	0·02	0·04	0·04	0·25

6.1.1 Solders may also be supplied in any other form by the mutual agreement between the purchaser and the manufacturer.

7. SAMPLING

7.1 A composite sample of 50 g shall be taken from each lot of 50 kg or part thereof representing one grade of alloy produced under uniform conditions of manufacture and offered for chemical analysis at one time.

7.2 The method of preparing samples for chemical analysis shall be in accordance with IS : 1817-1961*.

8. RETESTS

8.1 If the sample, taken from the composite sample, prepared under **7**, fails to meet the requirements specified under **4.1/4.2**, two more samples shall be taken from the same composite sample and analysed. If both the samples satisfy the relevant requirements, the lot shall be accepted. Should either of the samples fail, the lot represented shall be deemed as not complying with this standard.

9. MARKING

9.1 Each stick shall be legibly marked to indicate the grade of the material and manufacturer's name or trade-mark.

9.1.1 The material may also be marked with the ISI Certification Mark.

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

---

*Methods of sampling non-ferrous metals for chemical analysis.

APPENDIX A

(*Clause* 0.2.1)

PROPERTIES AND APPLICATIONS OF SOLDERS

(**For information only**)

GRADE	FLUX TYPE	MELTING RANGE, °C	TYPICAL APPLICATIONS AND METHOD	CORROSION RESISTANCE
SnZn20	Inorganic (mixtures of chlorides of heavy metals such as tin and zinc)	200-265	Work requiring low melting point or free running solders, for example, sheet metal work. Used with flux, no flux or abrasive methods. Heat may be supplied by soldering iron on light work, or by hot-plate or flame on heavier work, used with integral resin flux or inorganic flux available in wire form as cored solder	Poor unless protected
SnZn30	No flux	200-250	As abrasive solder without any flux. Used for aluminium sheaths and solid aluminium conductors of electric cables	Generally poor unless protected
SnPb53Zn	*Organic	170-215	Used for soldering conductors of electric cables. Good pasty range, used with flux	As joints are protected, corrosion resistance is not important
SnPb58Zn	*Organic	175-220	Used for soldering conductors of electric cables. Good pasty range, used with flux	As joints are protected, corrosion resistance is not important

---

*Organic fluxes are of reaction type, free from chlorides and suitable for soft soldering.

GRADE	FLUX TYPE	MELTING RANGE, C°	TYPICAL APPLICATIONS AND METHOD	CORROSION RESISTANCE
SnZn35Cd			Used for jointing Aluminium sheath, solidal cables and even on lugs and connectors for Aluminium wound transformers	
ZnAg5	*Halide (a small amount of zinc chloride together with potassium chloride, lithium chloride and sodium fluoride)	420-450 operating temperature 450-500	Used for sheet metal joints and repairs to castings. Joins aluminium to other metals, for example, copper and iron. It is an alternative to brazing, Used with an inorganic flux and flame heating sheet metal work	Good
ZnA1-5	*Halide	380-355	Furnace soldering possible with zinc flux	Good
ZnAl-5Cu5	*Halide (zinc chloride)	370	Sheet metal work. Particularly useful for jointing mitred corners of frames. Holes in castings may be filled after gouging out. Used with halide flux or no flux	Good
ZnAl-30	*Halide	460-510	Casting repairs	Good

---

*Halide fluxes are inorganic fluxes for hard soldering and are more akin to brazing fluxes.